STEROID METABOLISM AND FRONTAL LOBES

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The 17-ketosteroids are end-products of steroid metabolism, their source being the adrenal cortex. The daily urinary 17-ketosteroid output is fairly constant—3.5–14.6 mg. in 24 hours for adult normal women and 9.4–20 mg. in 24 hours for adult normal men (Patterson, McPhee, and Greenwood, 1942). Hemphill, MacLeod, and Reiss (1942) investigated the 17-ketosteroid values before and after brain operations, in particular bilateral prefrontal leucotomy (lobotomy), in six cases, and found that after the third post-operative month the urinary 17-ketosteroid excretion rises, indicating an increased steroid metabolism. Commenting on their results, they advanced the theory that an interference with the nervous pathways between the frontal lobes and the hypothalamus may influence the anterior pituitary, which in its turn alters the pituitary adreno-gonadal functions.

The cerebral control of steroid metabolism is of clinical as well as physiological importance, and the above-quoted conclusions have been reinvestigated in 12 cases. All the patients were females at the period of sexual maturity, and all had undergone bilateral prefrontal leucotomy, performed with a rotating-blade leucotome of 25 mm. cutting diameter. The urinary 17-ketosteroid output was followed up fortnightly for three to four months, except in the case of one patient who, after leaving the hospital, was inaccessible for the repeated investigations. The pre-operative and 3–4-monthly post-operative values are tabulated below.

Case No.	17-Ketosteroids in mg./24 hours	
	Pre-operative	3–4 Months Post-operative
1	15.1	11.4
2	6.1	4.4
3	14.6	10.9
4	10.0	6.5
5	13.2	—
6	11.0	4.8
7	14.2	4.2
8	10.9	10.5
9	23.6	14.0
10	20.3	19.5
11	12.4	9.6
12	9.3	8.4

The absence of the post-operative value in Case 5 has been explained; Cases 9 and 10 show high pre-operative values, but as the sample was taken at random they are retained in the series. It can be seen that the 17-ketosteroid output taken three to four months post-operatively is lower than that taken pre-operatively, in contradistinction to Hemphill and MacLeod's findings.

Further examination of our figures shows that the standard error of the mean difference is 1.05 mg./24 hours and Student's *t* ratio 3.71. For 10 degrees of freedom this is significant at the 1% level; thus the odds are 99 to 1 against its arising by chance. In other words, statistical evidence suggests very strongly that after bilateral injury to the prefrontal lobes the 17-ketosterone excretion is likely to diminish.

The hypothesis of other workers—namely, that the prefrontal lobes influence steroid metabolism—thus seems to be confirmed, but the direction of quantitative alterations is found to be contradictory. While no concrete explanation can be offered for these differences, attention should be drawn to the fact that the technique of leucotomy

(lobotomy) varies from hospital to hospital, and the extent and localization of the operative incision at various levels may be responsible for the difference in findings. Furthermore, Hemphill and his collaborators' reported cases were males, whereas the case material just presented consisted entirely of females.

Reports on frontal-lobe injuries and on lobotomies emphasize a frequently increased sensuality. In the above-reported case material three patients showed increased sensuality but no corresponding increase in the 17-ketosteroid excretion could be observed—a possible indication that the increased sensuality is not of neuro-hormonal genesis. In other words, the 17-ketosteroid values seem to be independent of the patients' psychosexual state.

To ascertain whether patients with frontal-lobe injury respond to stimulation in the same manner as "normals," 17-ketosteroid values have been studied on patients who had undergone leucotomy and on patients who suffer from a mild neurosis. These patients were stimulated by 8 gr. (0.53 g.) of pituitary whole gland in 24 hours, by 6 mg. of intramuscular "prostigmin" in 24 hours, and finally by the administration of an erythema dose of ultra-violet light on the day the urinary 17-ketosteroids were collected. These experiments are still incomplete and numerically do not lend themselves to statistical examination, but the main tendencies of the results so far are as follows:

Administration of pituitary whole gland raises the 17-ketosteroid excretion, but administration of the prostigmin results in lowered 17-ketosteroid excretion. These findings might confirm a cortico-pituitary control of the 17-ketosteroid excretion rather than an influence through autonomic mechanisms. On administration of an erythema dose of ultra-violet light the 17-ketosteroid excretion increases, as was reported by Myerson and Neustadt (1939). No differences in responses were found between operated and non-operated cases.

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Medical Memoranda

Haematoma of the Rectus Abdominis Muscle

Haematoma of the rectus abdominis muscle, especially the variety in which trauma is an inconspicuous factor and which is referred to as spontaneous to distinguish it from the traumatic variety, is very uncommon but of considerable clinical interest because it simulates very closely an acute intraperitoneal lesion.

CASE REPORT

A widow aged 71 was admitted to hospital on Aug. 3, 1947, complaining of severe abdominal pain of ten hours' duration. There was sudden onset of "tearing" pain in the right lower abdomen. The pain was continuous, aggravated by movement, and became steadily worse up to the time of admission. She vomited twice soon after the onset of pain. The bowels were opened before the attack and flatus had passed after the attack came on. Micturition was normal. There was a previous history of chronic bronchitis.

On examination the temperature was 99.2° F. (37.3° C.), pulse rate 120 and of poor quality, and respiration normal but somewhat laboured. The facies was pale and anxious, and the tongue moist and clean. The general appearance was one of moderate shock. Inspection revealed an ovoid swelling of the right lower abdomen. Abdominal respiratory movements were limited. The shoulder-raising